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IN THE CLAIMS

Please amend the claims as indicated:

- 1 1. (currently amended) An apparatus for use in a borehole for electrical imaging
2 during rotary drilling comprising:
3 (a) a resistivity sensor having an offset from a wall of the borehole that is
4 greater than a specified minimum value, the resistivity sensor including:
5 (A) a current electrode which conveys a measured current into the
6 formation, and
7 (B) a measure electrode spaced apart from said current electrode, and
8 (C) a processor which determines from a voltage of the measure
9 electrode and the measure current an indication of a resistivity of
10 the earth formation;
11 (b) an orientation sensor making a measurement of a toolface angle of said
12 apparatus during continued rotation thereof; and
13 (c) a device which maintains said resistivity sensor at said offset.
14
- 1 2. canceled.
2
- 1 3. (currently amended) The apparatus of claim 1 wherein said resistivity sensor is
2 mounted on one of (i) a pad, (ii) a rib, and (iii) a stabilizer.
3
- 1 4. canceled
2

1 5. canceled

2

1 6. (currently amended) The apparatus of claim 1 wherein said resistivity sensor
2 further comprises

3 (i) ~~a current electrode which conveys a measure current into said formation~~
4 ~~through a conducting fluid, and~~

5 (ii) at least one guard electrode proximate to said current electrode for
6 maintaining focusing of said measure current.

7

1 7. (original) The apparatus of claim 6 wherein said at least one guard electrode
2 focuses said measure current in a direction substantially normal to said borehole
3 wall.

4

1 8. (original) The apparatus of claim 7 wherein said at least one guard electrode
2 surrounds said measure electrode and maintains a focusing of said measure
3 current in a flushed zone of said formation.

4

1 9. canceled.

2

1 10. (original) The apparatus of claim 6 wherein said at least one guard electrode
2 comprises a plurality of guard electrodes that create substantially spherical
3 equipotential surfaces

1

2 11. canceled

3

1 12. (original) The apparatus of claim 8 further comprising monitor electrodes to
2 support the focusing in the presence of non negligible contact impedances.

3

1 13. (original) he apparatus of claim 9 further comprising monitor electrodes to
2 support the focusing in the presence of non negligible contact impedances.

3

1 14. (original) The apparatus of claim 8 wherein further comprising a pad that
2 substantially circumscribes said apparatus, said pad carrying said sensor thereon

3

1 15. (original) The apparatus of claim 14 further comprising monitor electrodes to
2 support the focusing in the presence of non negligible contact impedances.

3

1 16. (previously presented) The apparatus of claim 8 further comprising a controller
2 which maintains a substantially constant power consumption by said
3 electrodes.

4

1 17. canceled

2

1 18. canceled

2

1 19. canceled

2

1 20. (currently amended) The apparatus of claim 1 wherein said orientation sensor is
2 selected from the group consisting of comprises (i) a magnetometer, and (ii) an
3 accelerometer.

4

1 21. canceled

2

1 22. canceled

2

1 23. canceled

2

1 24. (original) The apparatus of claim 1 wherein said borehole is filled with a
2 substantially nonconducting fluid and wherein said resistivity sensor is
3 capacitively coupled to said earth formation.

4

1 25. (original) The apparatus of claim 24 wherein said resistivity sensor makes
2 measurements at a plurality of different frequencies.

3

1 26. canceled

2

1 27. canceled.

2

1 28. canceled

2

1 29. canceled

2

1 30. canceled.

2

1 31. canceled

2

1 32. canceled

2

1 33. canceled

2

1 34 (withdrawn) A system for use in a borehole for determining a resistivity
2 parameter during drilling of a borehole in an earth formation comprising:

3 (a) a bottom hole assembly (BHA) including

4 (i) a resistivity subassembly having a resistivity sensor with an offset
5 from a wall of the borehole that is greater than a specified
6 minimum value during rotation of the BHA;

7 (ii) an orientation sensor on said subassembly which makes a
8 measurement of a toolface angle of said subassembly during
9 continued rotation thereof; and

10 (ii) a device which maintains said resistivity sensor at said offset.

11 (b) a processor which determines said resistivity parameter from
12 measurements made by said resistivity sensor;

- 13 (c) a device which drills said borehole; and
- 14 (d) conveyance device which conveys said BHA into said borehole.
- 15
- 1 35. (withdrawn) The system of claim 34 wherein said device for drilling said borehole
- 2 comprises a drill bit.
- 3
- 1 36. (withdrawn) The system of claim 34 wherein said conveyance device comprises
- 2 a drill string.
- 3
- 1 37. (withdrawn) The system of claim 34 wherein said processor is part of said BHA.
- 2
- 1 38. (withdrawn) The system of claim 34 wherein said processor includes a
- 2 memory device which stores at least a subset of measurements made by said
- 3 resistivity sensor.
- 4
- 1 39. (withdrawn) The system of claim 34 wherein said resistivity sensor comprises a
- 2 galvanic sensor.
- 3
- 1 40. (withdrawn) The system of claim 39 wherein said sensor further comprises
- 2 (i) a current electrode which conveys a measure current into said formation
- 3 through a conducting fluid, and
- 4 (ii) at least one guard electrode proximate to said current electrode which
- 5 maintains focusing of said measure current.

6

1 41. (withdrawn) The system of claim 40 wherein said processor maintains a
2 substantially constant power consumption by said electrodes.

3

1 42. (withdrawn) The system of claim 34 wherein said orientation sensor comprises a
2 magnetometer.

3

1 43. (withdrawn) The system of claim 34 wherein said orientation sensor comprises an
2 accelerometer.

3

1 44. (withdrawn) The system of claim 34 wherein said device comprises a stabilizer.

2

1 45. (withdrawn) The system of claim 34 wherein said device comprises a steerable
2 rib.

3

1 46. (withdrawn) The system of claim 34 wherein said borehole is filled with a
2 substantially nonconducting fluid and wherein said resistivity sensor is
3 capacitively coupled to said earth formation.

4

1 47. (withdrawn) The system of claim 46 wherein said resistivity sensor makes
2 measurements at a plurality of different frequencies.

3

- 1 48. (withdrawn) The system of claim 34 wherein said borehole includes a
2 substantially non-conducting fluid therein and wherein said resistivity sensor
3 conveys a measure current into said formation using capacitive coupling.
4
- 1 49. (withdrawn) The system of claim 34 wherein said resistivity sensor further
2 comprises a shielded dipole.
3
- 1 50. (withdrawn) The system of claim 34 wherein said resistivity sensor further
2 comprises a directionally sensitive induction logging tool.
3
- 1 51. (withdrawn) The system of claim 50 wherein said directionally sensitive induction
2 logging tool comprises a quadrupole transmitter.
3
- 1 52. (withdrawn) The system of claim 34 wherein said resistivity sensor further
2 comprises a radio frequency microwave transmitter
3
- 1 53. (withdrawn) The system of claim 34 wherein said resistivity parameter comprises
2 a resistivity image of said borehole.
3
- 1 54. (withdrawn) A method of determining a parameter of an earth formation during
2 formation of a borehole in said earth formation by a device on a bottom hole
3 assembly (BHA), the method comprising:

- 4 (a) maintaining a resistivity sensor on said BHA substantially at an offset
5 from a wall of the borehole less than a specified minimum value;
6 (b) using said resistivity sensor for making measurements indicative of said
7 parameter during continued rotation of said BHA;
8 (c) using an orientation sensor on said BHA for making a measurement of a
9 toolface angle of said BHA during said continued rotation; and
10 (d) using a processor for determining from said measurements said parameter
11

1 55. (withdrawn) The method of claim 54 wherein said resistivity sensor comprises a
2 galvanic sensor.
3

1 56. (withdrawn) The method of claim 54 further comprising mounting said resistivity
2 sensor on a pad.
3

1 57. (withdrawn) The method of claim 54 further comprising mounting said resistivity
2 sensor on a rib of said BHA.
3

1 58 (withdrawn) The method of claim 54 further comprising mounting said resistivity
2 sensor on a stabilizer of said BHA.
3

1 59. (withdrawn) The method of claim 54 further comprising
2 (i) using a current electrode of said resistivity sensor for conveying a measure
3 current into said formation through a conducting fluid, and

4 (ii) using at least one guard electrode proximate to said current electrode for
5 maintaining focusing of said measure current.

6

1 60. (withdrawn) The method of claim 59 further comprising using said at least one
2 guard electrode for focusing said measure current in a direction substantially
3 normal to a borehole wall.

4

1 61. (withdrawn) The method of claim 60 wherein said at least one guard electrode
2 surrounds said measure electrode and maintains a focusing of said measure
3 current in a flushed zone of said formation.

4

1 62. (withdrawn) The method of claim 59 further comprising using said at least one
2 guard electrode for creating substantially spherical equipotential surfaces

3

1 63. (withdrawn) The method of claim 54 further comprising:

2 (i) using a current electrode of said resistivity sensor for conveying a measure
3 current into said formation,

4 (ii) measuring a voltage of a measure electrode spaced apart from said current
5 electrode; and

6 (iii) using said processor for determining from a voltage of said measure
7 electrode and said measure current said resistivity parameter.

8

1 64. (withdrawn) The method of claim 60 further comprising using monitor electrodes
2 to support the focusing in the presence of non negligible contact impedances.
3

1 65. (withdrawn) The method of claim 61 further comprising using monitor electrodes
2 to support the focusing in the presence of non negligible contact impedances.
3

1 66. (withdrawn) The method of claim 60 further comprising carrying said sensor on a
2 pad that substantially circumscribes said apparatus.
3

1 67. (withdrawn) The method of claim 66 further comprising using monitor electrodes
2 to support the focusing in the presence of non negligible contact impedances.
3

1 68. (withdrawn) The method of claim 60 further comprising using a processor for
2 maintaining a substantially constant power consumption by said electrodes.
3

1 69. (withdrawn) The method of claim 64 further comprising using a processor for
2 maintaining a substantially constant power consumption by said electrodes.
3

1 70. (withdrawn) The method of claim 66 further comprising using a processor for
2 maintaining a substantially constant power consumption by said electrodes.
3

1 71. (withdrawn) The method of claim 67 further comprising using a processor for
2 maintaining a substantially constant power consumption by said electrodes.

3

1 72. (withdrawn) The method of claim 54 wherein said orientation sensor comprises a
2 magnetometer.

3

1 73. (withdrawn) The method of claim 54 wherein said orientation sensor comprises
2 an accelerometer.

3

1 74. (withdrawn) The method of claim 54 further comprising using a stabilizer for
2 maintaining said specified offset.

3

1 75. (withdrawn) The method of claim 54 further comprising using a steerable rib for
2 maintaining said specified offset.

3

1 76. (withdrawn) The method of claim 54 further comprising:
2 (i) using said BHA in a borehole is filled with a substantially nonconducting
3 fluid, and
4 (ii) capacitively coupling said resistivity sensor to said earth formation.

5

1 77. (withdrawn) The method of claim 76 further comprising using said resistivity
2 sensor for making measurements at a plurality of different frequencies.

3

1 78. (withdrawn) The method of claim 76 further comprising using said resistivity
2 sensor for making measurements at two frequencies.

3

1 79. (withdrawn) The method of claim 77 further comprising using said processor for
2 performing a multi-frequency focusing of said measurements.

3

1 80. (withdrawn) The method of claim 54 wherein said borehole includes a
2 substantially non-conducting fluid therein.

3

1 81. (withdrawn) The method of claim 55 further comprising:

2 (i) using said BHA in a borehole is filled with a substantially nonconducting
3 fluid, and

4 (ii) capacitively coupling said resistivity sensor to said earth formation

5

1 82. (withdrawn) The method of claim 54 wherein said resistivity sensor further
2 comprises a shielded dipole.

3

1 83. (withdrawn) The method of claim 80 wherein said resistivity sensor further
2 comprises a shielded dipole.

3

1 84. (withdrawn) The method of claim 80 wherein said resistivity sensor further
2 comprises a directionally sensitive induction logging tool.

3

1 85. (withdrawn) The method of claim 84 wherein said directionally sensitive
2 induction logging tool comprises a quadrupole transmitter.

3

1 86. (withdrawn) The method of claim 80 wherein said resistivity sensor further
2 comprises a radio frequency microwave transmitter.

3

1 87. (withdrawn) The method of claim 54 further comprising using an induction coil as
2 said resistivity sensor.

3

1 88. (withdrawn) The method of claim 87 further comprising using said processor for
2 determining an inductance of said induction coil.

3

1 89. (withdrawn) The method of claim 86 further comprising using said processor for
2 determining an extent of a fluid invasion of the earth formation.

3

1 90. (withdrawn) The method of claim 54 wherein said orientation sensor comprises a
2 magnetometer

3

4 91. (previously presented) The apparatus of claim 1 further comprising a bottomhole
5 assembly (BHA) carrying the resistivity sensor into the borehole.

6

1 92. (previously presented) The apparatus of claim 1 further comprising a conveyance
2 device which conveys the resistivity sensor into the borehole.

3

- 1 93. (previously presented) The apparatus of claim 91 further comprising an
2 orientation sensor that makes measurements of an orientation of the BHA during
3 continued rotation thereof.
- 4
1 94. (new) An apparatus for use in a borehole for electrical imaging during rotary
2 drilling comprising:
3 (a) a resistivity sensor having an offset from a wall of the borehole that is
4 greater than a specified minimum value
5 (b) an orientation sensor making a measurement of a toolface angle of said
6 apparatus during continued rotation thereof; and
7 (c) a steerable rib which maintains said resistivity sensor at said offset.
8
- 1 95. (new) The apparatus of claim 94 wherein said resistivity sensor comprises
2 galvanic sensor.
3
- 1 97. (new) The apparatus of claim 95 further comprising a controller which maintains
2 a substantially constant power consumption by electrodes of said galvanic sensor.
3
- 1 98. (new) The apparatus of claim 94 further comprising an orientation sensor selected
2 from the group consisting of (i) a magnetometer, and (ii) an accelerometer.
3
- 1 99. (new) The apparatus of claim 94 wherein said borehole is filled with a

2 substantially nonconducting fluid and wherein said resistivity sensor is
3 capacitively coupled to said earth formation.

4

1 100. (new) The apparatus of claim 94 wherein said resistivity sensor is selected from
2 the group consisting of (i) a shielded dipole, and (ii) a quadrupole.

3

1 101. (new) An apparatus for use in a borehole for electrical imaging during rotary
2 drilling comprising:

3 (a) a resistivity sensor having an offset from a wall of the borehole that is
4 greater than a specified minimum value, the resistivity sensor including a
5 shielded dipole;

6 (b) an orientation sensor making a measurement of a toolface angle of said
7 apparatus during continued rotation thereof; and

8 (c) a device which maintains said resistivity sensor at said offset.